COMPUTER - RELATED SERVICES :

A $100 BILLION MARKET BY 1987

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Y-MDB
1983

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COMPUTER-RELATED SERVICES
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I INTRODUCTION

I   INTRODUCTION

- The purpose of this report is to present summary forecasts and analyses of user expenditures for five key delivery modes of the computer-related services industry: software products, professional services, processing services, integrated systems, and field service.

- The term "information services" includes the first four delivery modes mentioned above. The combination of information services and field services constitutes "computer-related services" for the purposes of this report.

- This report is based on information collected from INPUT's Information Services Industry Program and Field Service Program.

- The data presented are based on thousands of interviews conducted by INPUT with users of computers and information services as well as with vendors and industry experts during the past year. The information gathered has been analyzed and interpreted by INPUT's senior staff.

- Throughout this report emphasis is placed on profiling market trends, specifying driving forces, and identifying challenges and opportunities available to information services vendors during the next five years.

- The report focuses on U.S. markets. All international markets, including Canada, are excluded.

- The base year for forecasting is 1981. User expenditures presented are for the years 1982 through 1987.

- Assumptions upon which the forecasts in part depend, such as inflation rates and economic growth, are presented and analyzed in the text.

  - The data were gathered from U.S. government and private sector sources and in some cases were modified by INPUT based on its best judgment.

  - These econometric forecasts may be modified by clients to fit individual assessments of future economic conditions.

- All data in the main body of the text have been rounded to the nearest $10 million to reduce implications of an unwarranted degree of accuracy.

- Related INPUT reports are:

  - U.S. Information Services Markets, 1982-1987:
    Volume 1, Processing Services and Integrated Systems
    Volume 2, Software Products and Professional Services

  - 1982 Field Service Annual Report

  - Annual Planning Report, 1982

- INPUT welcomes any inquiries or comments from clients on the information presented as well as suggestions for changes in the structure or contents of future editions of this report.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. INFORMATION SERVICES MARKETS

- For the 10-year period ending December 1981, the U.S. information services market grew at the compound average annual growth rate (AAGR) of 18%. Last year, INPUT's expectation for the five-year period 1981-1986 was 24%. The sharp pullback of the entire economy reduced the 1982 services performance to a growth of 16%.

- This downturn is not expected to reverse completely in 1983, which is shaping up as a transition year from a recession economy to a recovery in 1984. As a result, total services industry growth in 1983 is expected to be 19%, still below the 24% growth experienced in 1981. In fact, INPUT does not expect the industry to fully recover 1981 growth until 1985.

- Over the full five-year period to 1987, the information services industry compound growth is nevertheless expected to be 24%, as shown in Exhibit II-1, sustained by integrated systems (29% AAGR) and software products (38% AAGR).

- During the next five years batch processing is expected to sustain a steady growth, averaging 9% compound growth to 1987. Specialized services will support this growth, particularly those with a telecommunications-based component.

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EXHIBIT II-1

U.S. COMPUTER-RELATED SERVICES MARKET,

1982-1987
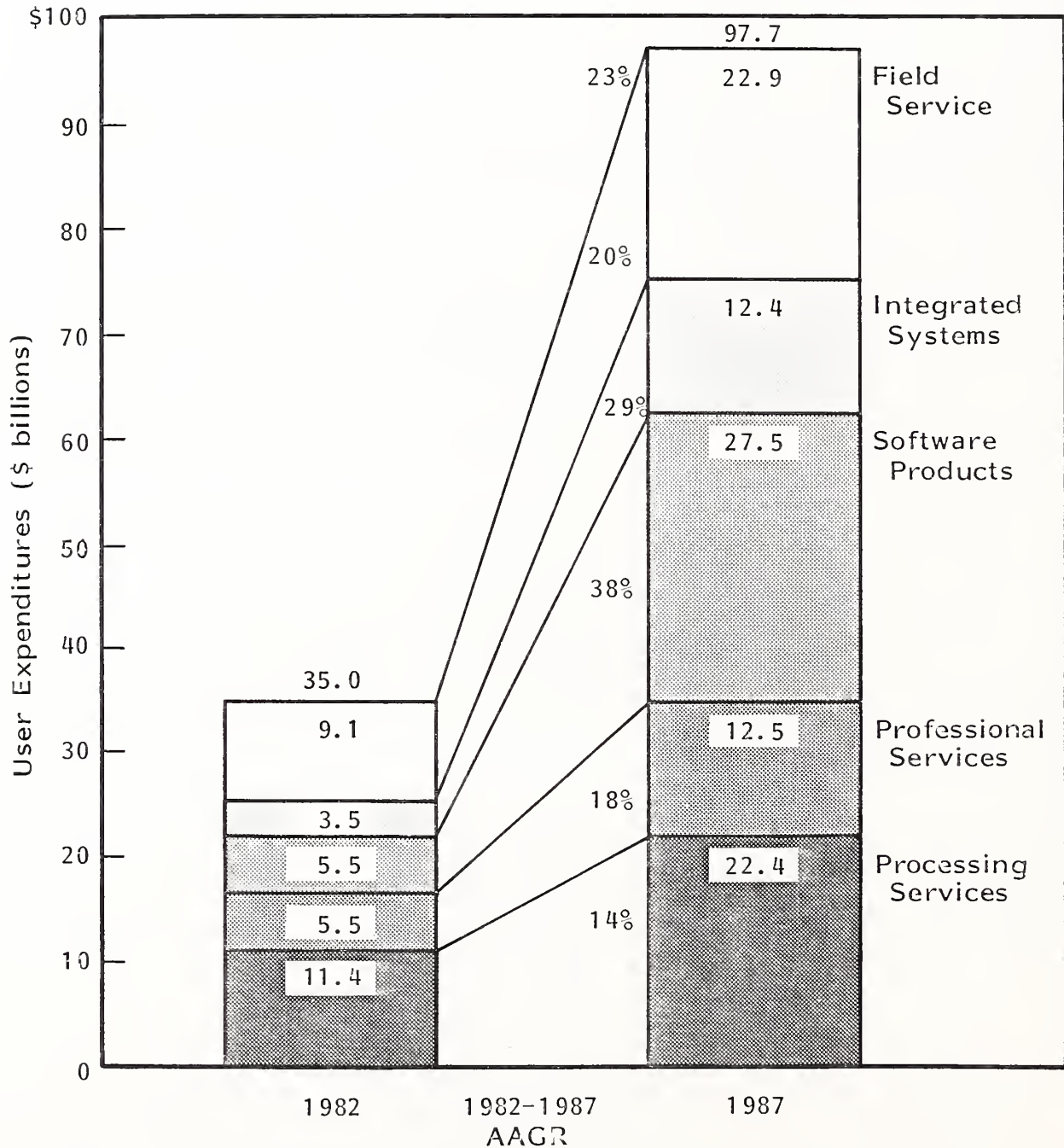
1) U.S. Information Services AAGR, 1982-1987 = 24%

2) NOTE: Each market has been rounded to nearest $0.1 billion; therefore markets may not total precisely.

- Remote computing services (RCS) are expected to slowly recover from the substantial cutbacks of 1982. Utility services will be the last to recover, and RCS will be dominated by industry-specific services from now on.

- The processing facilities management (PFM) market is also driven by industry-specific services and has been only slightly impacted by the 1982 business downturn.

- The integrated systems market is being supported by a new development: integrated (turnkey) personal computer systems.

- Field service revenue is expected to grow at an AAGR of 20% from $9.1 billion in 1982 to $22.9 billion in 1987.

- In summary, the recession has forced management to take a new, hard look at company goals, products, productivity, and profitability. Hard decisions, often put off before, have had to be made.

- These are all positive factors; the negative side is the accompanying weakening of balance sheets, the effects of which will remain long after the recession is over.

B.   PROCESSING SERVICES MARKETS

- The processing services market will almost double in size by 1987, from a 1982 base of $11.4 billion. The overall AAGR of 14% will be slowed by the batch processing services market which will grow at an AAGR of only 9%.

- The principal growth area will be RCS, at a 17% AAGR. This is fueled by industry-specific services and data base services (which will account for half of the $12.4 billion market in 1987).

- An additional high-revenue, high-growth area in RCS is the large custom application: worldwide manufacturing control systems for individual multi-national corporations, worldwide order entry systems, worldwide cash management systems, etc.

- The AAGR of processing facilities management services is expected to be 18%. This could turn out to be a conservative estimate since, in addition to strong markets in the medical and banking/finance sectors, new contracts from federal government business could account for an additional $2 billion (which would boost growth to 30% per annum). The eventuality of such large contract business can only be guessed at and is not included in the forecast.

- The attractiveness of the processing facilities management business for the government sector lies partially in the significant reduction in procurement cycles (by as much as 10 years) that can be achieved when the computer hardware is owned by the services vendor.

- Batch processing is being sustained by large-volume specialist services such as mail order list processing, tax processing, and seismic processing.

- In order to retain current business and add new markets, further specialization of services that meet specific requirements within a given industry is neces-sary. Examples of developed markets in this area are cash management and personal trust systems in banking, pressure vessel design in process manu-facturing, and fleet management systems in transportation.

- Cross-industry services such as tax processing and order entry are already viable businesses for those companies that have been able to establish:

    - In-house expertise of the business principles involved.

    - A company image in that area of service.

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- A critical mass of repeat business.

- A viable competitive edge.

• Many of the smaller vertical and horizontal markets have seen the number of participating vendors dwindle rapidly in the last 24 months. Those vendors leaving the market have lacked the above characteristics.

• Nevertheless, some very large companies are still reluctant to develop the in-house competence necessary to:

- Understand the business requirement fully (as opposed to simply purchasing the license to an existing product for inclusion in the library of products offered).

- Sell the product, by demonstrating an understanding of the business to the prospect's key buyer.

• Without a company-wide strategy and commitment to a clear set of vertical/horizontal market goals, a vendor's processing service market share will decline.

• Preferably, a processing service aimed at a given vertical/horizontal market will be complemented by software product, integrated system, and professional services offerings to those same markets. This full line of complementary services and products needs to be expanded continuously. This year's expansion should have included:

- Addition of personal computers.

- Addition of briefcase computers.

- Addition of external specialized reference data bases.

- Addition of customized corporate data bases.

- Expanded computer output options.

C. SOFTWARE PRODUCTS MARKETS

- By 1987 software products will emerge as the industry's largest service mode with $27.5 billion in user expenditures. Its 38% AAGR is more than double the 14% AAGR forecast for processing services, 1982's largest service mode.

1. SYSTEMS SOFTWARE

- Systems software will increase more than fourfold to $11.7 billion by 1987, a 35% AAGR. Its share of the software product market will decline slightly from 47% to 42%.

- Applications development tools will be the fastest growing segment of systems software with a 39% AAGR. By 1987 it will comprise 61% of the systems software market, as compared to a 53% share in 1982.

- The most successful applications development tools will be those meeting the needs of multitudes of novice end users. The power of well-conceived, end-user-oriented software is most vividly illustrated by the market penetration of VisiCalc and its electronic spreadsheet competitors.

- Systems control software (e.g., operating systems, communications monitors, systems library software) comprises the second largest portion of the systems software market with $2.7 billion in user expenditures by 1987.

- An important emerging market is end-user-oriented operating systems provided by independent software vendors. These products will enjoy significant market acceptance in the years ahead.

- Personal computer software products will account for 13% of all systems software user expenditures during the next five years. Major innovations in the power, flexibility, and degree of integration of these products will occur during this period.

- To compete effectively in the systems software market of the future, vendors must obtain major sources of financing to fund product development and marketing.

2. APPLICATIONS SOFTWARE

- Applications software is the fastest growing service mode within the information services industry. It will grow at a 40% AAGR from a 1982 base of $2.9 billion to a 1987 level of $15.9 billion.

- The need for applications software is being stimulated by:

  - Major increases in the number of end users with budget authority.

  - The urgency of the solution: end users can't wait for a lengthy software development cycle.

  - Vendor innovations, especially in integrated products that link to related systems.

  - Market acceptance of new applications, such as word processing and graphics.

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- Cross-industry applications will continue to account for more than one-half of all applications software expenditures during this five-year period.

- Information analysis is becoming the largest and fastest growing of the cross-industry applications products. By 1987 it will account for $2.8 billion in user expenditures, a 51% AAGR from 1982.

  - It will become a larger market than accounting systems, currently the largest in user expenditures.

  - The main driving force behind the growth of information analysis is the end-user demand for better insights via information-based decisions in order to cope with an increasingly complex world.

- Personal computer applications software will be an important part of the applications software market growing from 10% in 1982 to 13% by 1987.

D.   PROFESSIONAL SERVICES MARKETS

- Professional services will grow from $5.5 million to $12.5 billion by 1987, an 18% AAGR. Although annual user expenditures will increase $7 billion during this period, its share of the information services market will drop from 21% to 17%.

- Professional services is the most concentrated of the information services industry service modes. Two-thirds of all professional services revenue is obtained by firms over $10 million in size.

- The Big 8 accounting firms are very active in this marketplace with an 8% share. Seven of the Big 8 are among the 40 largest vendors serving this market.

- Programming and analysis comprises about three-quarters of the professional services market throughout the forecast period.

    - This service has a high appeal to a select group of industries.

    - The federal government is the dominant sector accounting for 26% of all expenditures during the 1982-1987 period.

    - The next four largest industry markets are discrete manufacturing, state/local governments, process manufacturing, and banking. In total they account for one-half of the market.

- These same industries are the primary buyers of consulting and education services.

- Professional services facilities management (PSFM) is dominated by the federal government, which accounts for over 70% of user expenditures. Because of this, funding problems within the federal government are an important contributor to the market share decline of PSFM from 9% of professional services expenditures in 1982 to 6% in 1987.

- Challenges facing professional services vendors include:

    - Proliferation of technology, which further fragments the market for specific sets of skills.

    - Pressure on profit margins caused by the market slowdown in conjunction with escalating labor costs.

- A number of factors, however, are contributing to a positive outlook for the future.

- Market interest in development of large, complex systems with expanded on-line facilities that require skills not usually found in-house and encompass applications not offered by software product vendors.

- A trend toward increased intra-industry cooperation among clients for the purpose of joint development of systems too costly to be individually funded.

E.   INTEGRATED SYSTEMS MARKETS

- The integrated systems market was worth $3.5 billion in 1982 and grew 22% from 1981. This was a drop in excess of one-third from the 34% growth achieved between 1980 and 1981.

- Growth to 1987 is expected to be at an average yearly rate of 29% with the larger share coming from industry-specialized systems. This particular sector is boosted by a rapidly developing personal-computer-based integrated systems market, which will reach $800 million by 1987.

- The principal markets are systems for CAD/CAM, seismic processing, bank processing, automobile dealers, hardware stores, warehousing, and medical applications.

- All of these markets have shown some resilience to the economic downturn but are currently depressed (with the exception of medical systems, which have proven to be a recession-proof market). When the recovery finally arrives (currently forecast for fourth quarter 1983) the pipeline of delayed orders in all of these markets should support a rapid return to 1981 growth rates.

- Industry-specialized markets already account for two-thirds of the total integrated systems market in the U.S. The five-year forecast is for this trend to continue and for these systems to claim nearly 70% of the total market by 1987.

- Integrated systems growth is expected to moderate after a peak in 1985. By then the total market will be approaching $7.3 billion and will already be larger than two of the three processing services markets, namely batch and PFM, and will be rapidly gaining on the third, RCS.

- The new challenges to integrated systems vendors are:

  - Microcomputer- and personal-computer-based systems offered by hundreds of small start-up companies, many of which are populated by industry specialists in very narrow market segments (e.g., law office partners, doctors, tax specialists).

  - Hardware manufacturers that are beginning to integrate industry specific applications packages with their hardware in direct competition with some of their OEMs (e.g., Prime Computers).

  - RCS vendors who recognize that they must compete in this market or lose business.

F.   FIELD SERVICE MARKETS

- Field service revenue growth is being held back in the short term by the economy's leveling effect on equipment sales and in the long term by the reliability of new products. These factors have lowered the 1982-1987 growth forecast to 19.8% (from 20% forecast in 1981).

- Field service management therefore needs to find new service growth areas.

- One such area is system software maintenance, which has yet to be fully exploited as a revenue base:

  - Only partial site development has been achieved for all the system software options available on the hardware.

  - The charges for many system software items are too low to cover ongoing development and error correction.

  - System software sales could be emphasized after initial configuration sales.

- Exploration of these opportunities plus the growth of the equipment-installed base will double system software maintenance revenue over the next two years.

- Field service managers also need to be aware of users' changing needs, which include:

  - System reliability: users are prepared to pay extra for quality products they can rely upon.

  - On-site maintenance: a recent INPUT study of low-cost equipment maintenance showed that users would prefer to have on-site service, even if annual costs are 25% of the product's list price.

  - What to buy and when: users often think the field service engineer's technical knowledge makes him an information systems specialist and therefore follow his advice.

- Within the next five years, field service organizations will be facing a new challenge: the integration of office products with information systems. At the field service level, the difficulties will include:

  - Field service managers without office products experience.

  - IS managers unfamiliar with office products users.

- The need, then, is less for technical ability than for management understanding and direction.

- The office products integration problem is still some way off for most field service managers interviewed. One problem already here, however, is the rapidly changing product mix in information systems.

- Because of changes brought about by personal computers and executive workstations, maintenance strategies must be revised to accommodate:

  - Low-cost products.

  - Wide geographic product dispersion.

  - The need to preserve the standard of service.

  - Distributor networks.

  - Need for maintained or improved profit levels.

- Vendors have met the challenge in a variety of ways, including:

  - Attempts at educating the user to use central repair shops and "return for repair" contracts.

- Adding additional tiers of response levels/types of contracts.

- Test marketing third-party module repair/delivery service.

- Partial user self-maintenance.

- Redundant hardware left on-site (e.g., extra terminal).

- User-purchased spares.

- Software support centers.

- Remote diagnostic centers.

- Facilities management service (of all equipment on-site from multiple vendors).

- These changes in maintenance strategies are not easily made because they sometimes require new field service engineering skills.

- This raises the final field service consideration of this report: personnel. Clear policies enabling the current service force to understand changes are vital to successful transition.

III PROCESSING SERVICES MARKET

III   PROCESSING SERVICES MARKET

- The processing services market is comprised of three sectors: remote computing services, batch processing, and processing facilities management.

A.   REMOTE COMPUTING SERVICES

1.   MARKET GROWTH

- The remote computing services market, like all processing services markets, was severely affected by the recession. The total market grew 11% in 1982 versus 17% in 1981. It will grow an average of 17% per annum from 1982 to 1987, as shown in Exhibit III-1.

- The most recession proof of the three categories of RCS in 1982 was the industry-specific group of services, i.e., those vertical market services that require specialized industry knowledge and products. This market grew 14% in 1982 versus 17% in 1981 and is expected to provide the bulk of RCS growth through 1987.

- The only other market to sustain near normal growth was the medical sector, but it generated only $249 million of RCS revenue in 1982.

EXHIBIT III-1

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U.S. REMOTE COMPUTING SERVICES MARKET,
1982-1987
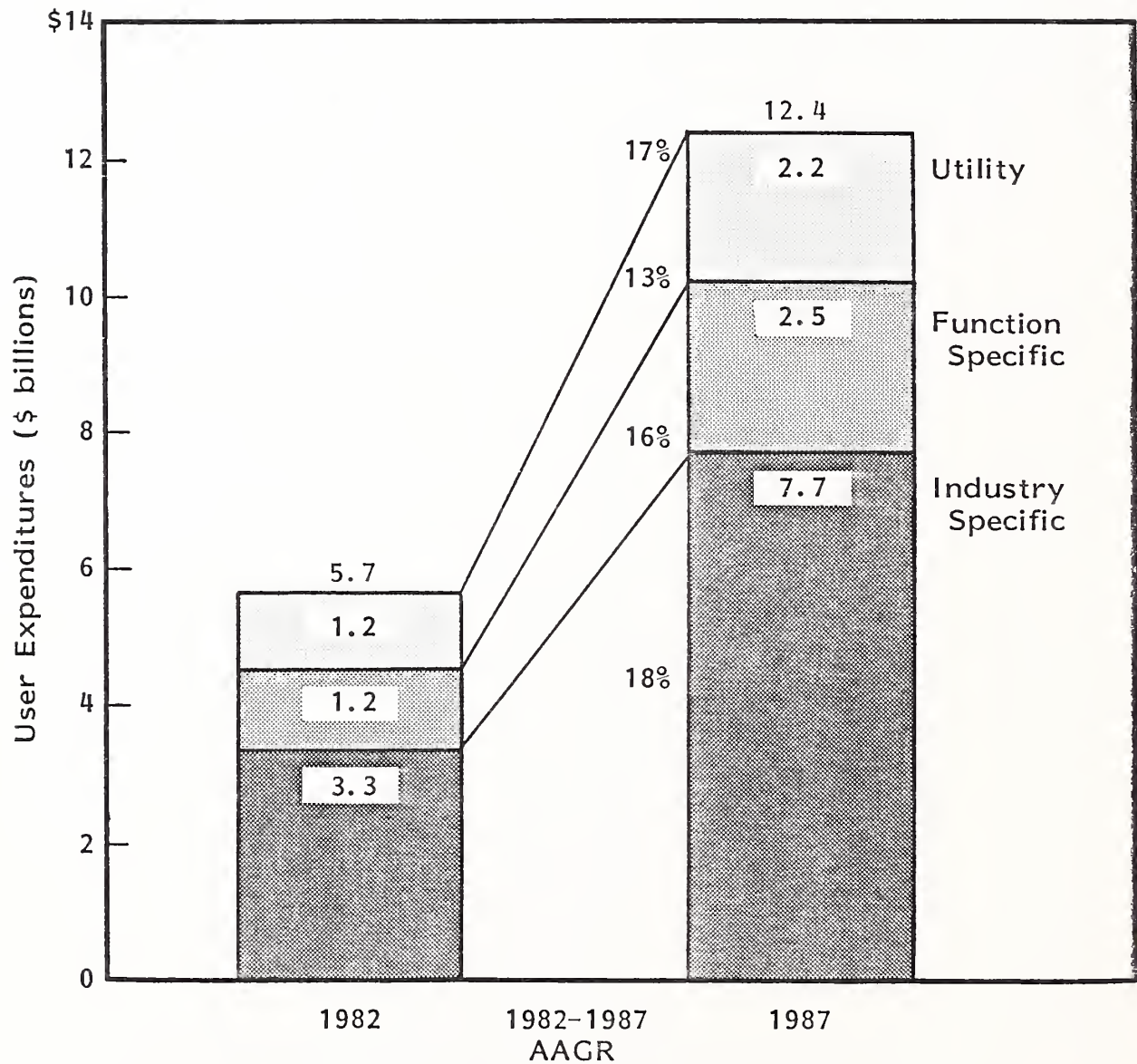
Chart: Stacked bar chart titled "User Expenditures ($ billions)"

- 1982 total: 5.7
  - Utility: 1.2
  - Function Specific: 1.2
  - Industry Specific: 3.3
- 1987 total: 12.4
  - Utility: 2.2
  - Function Specific: 2.5
  - Industry Specific: 7.7

1982-1987 AAGR:
- Utility: 17%
- Function Specific: 13%
- Industry Specific: 16%
- 18%

NOTE: Each market has been rounded to nearest $0.1 billion; therefore markets may not total precisely.

- The lowest growth sector in 1982 was education, which grew only 2% (in effect contracted 4% in real terms). This rate is expected to continue throughout the forecast period.

- INPUT expects most sector markets' growth rates to recover over the next five years, but 1981 expectations have been cut back. The key markets, in order of importance, are:

  - Banking and finance, nearly 90% of which will be captured by industry-specific services.

  - Discrete manufacturing, nearly two-thirds of which will be captured by industry-specific services.

  - Services, including general business, tax processing, auditing, and legal services.

- Two additional markets of almost equal size and growth are process manufacturing (particularly the energy industry applications, gradually being converted from batch to on-line services) and retail distribution (particularly credit checking services and order processing).

- These sectors jointly accounted for 62% of the total RCS market in 1982 and are expected to increase their share to 65% by 1987.

2.   MARKET TRENDS

- The overall picture for remote computing services appears to be a gloomy one for the immediate future. The main reasons are:

  - Short-term revenue growth will be very weak for the majority of vendors; many will see a contraction of business and net income.

- Recovery will be slow in coming, probably not before 1984, certainly not before first quarter 1983.

- The shift of large-account business to in-house processing will continue, and small, single-application needs will be siphoned off by personal computers.

- The need to target industry-specialized markets means substantial increases in fixed costs in the form of industry specialists/consultants; these costs cannot be avoided if these growth markets are to be addressed.

- More than ever, the need is to focus on opportunity by clearly and narrowly defining the goals of the company and pursuing the markets so defined with a set of integrated products, services, and delivery modes. This approach should include transferable applications software (from mainframe to micros, as with MSA, and from RCS host to in-house system) as well as integrated systems and professional services complements.

B. BATCH PROCESSING SERVICES

I. MARKET GROWTH

- 1982 saw the batch processing market slip below the value of the software products market for the first time in its history. In current dollar terms the market was worth $4.2 billion, up 9% from 1981.

- INPUT believes that 1981 growth rates for batch processing will not be seen again. Expectations for the 1982-1987 timeframe are for an AAGR of 9%, as shown in Exhibit III-2, down from 15% in 1981. After a minor recovery in 1983, the batch services market is expected to begin a long, slow decline in

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EXHIBIT III-2

U.S. BATCH PROCESSING SERVICES MARKET,
1982-1987
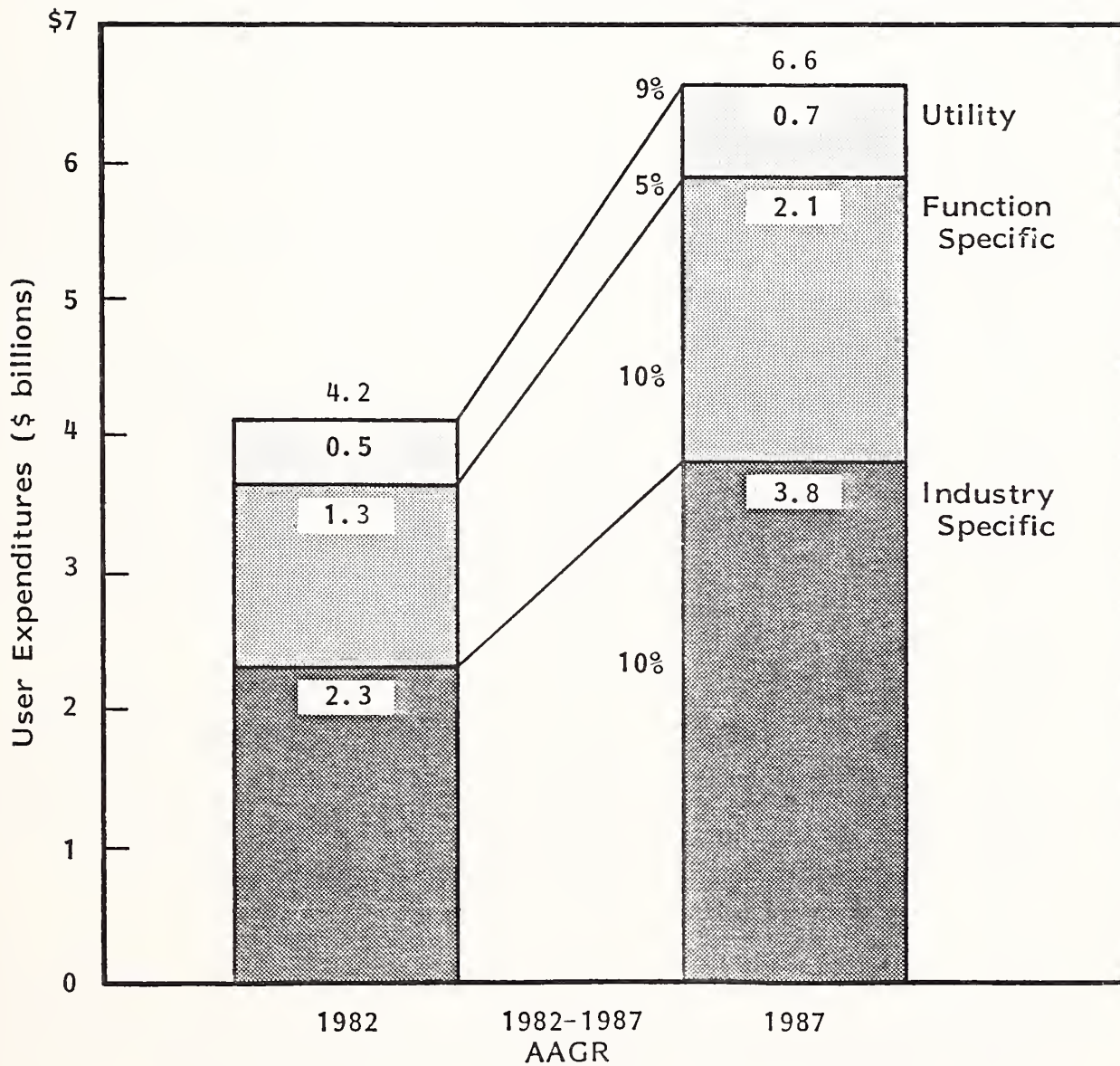
NOTE: Each market has been rounded to nearest $0.1 billion; therefore markets may not total precisely.

growth rate, which in real terms (i.e., net of inflation) will equate to an annual growth of 2% in 1987.

- As with the RCS market, the worst hit of the three major batch services categories (function specific, industry specific, and utility) was utility services, which grew 2% over 1981 values. In real terms this was a decrease of 3% in the size of the market, and INPUT expects this market to remain flat, in real terms, throughout the forecast period.

- The industry-specific market was most resistant to the economic crunch but is not expected to completely recover either. Competition for industry-specific batch services is now too fierce from RCS, integrated systems, in-house systems, and personal computers for the market to continue historical growth rates.

- Process manufacturing is the only substantial growth sector in the forecast period, mainly due to the large backlog of seismic processing business still extant. Although energy exploration and data acquisition in this field are substantially down, data processing growth is not dramatically off (still rising 11% in 1982). This is a very difficult market to penetrate, however, despite the attraction of its 18% growth rate.

- Banking and finance is the second largest market, worth $949 million in 1982. Net growth will be substantially impacted by conversions to in-house processing, remote computing services, and processing facilities management (PFM). Most of the processing is correspondent bank processing.

- Data entry and output services, such as the computer output microfilm (COM) services offered by Anacomp, continue to grow as a result of the effort to replace paper.

- The size of the discrete manufacturing batch services market is mainly due to function-specific services (payroll, etc.) provided to the enormous number of

small companies found in that sector. This is not a growth market, having almost attained its point of maximum value in real terms.

- The same is true of most of the remaining sectors. However, the size of these batch markets, in aggregate, is so large ($4.2 billion in 1982 and $6.6 billion in 1987) and so complex that massive conversions of large portions of this business are unlikely. Rather, the batch market will experience a slow loss of growth, then a slow decline over a long period of time (possibly as long as the remainder of the century).

2.   MARKET TRENDS

- The batch market, which until 1975 was the largest services market available, has already fallen to fourth place behind RCS, professional services, and software products. By 1984 it will also be overtaken by the integrated systems market.

- As the batch market declines, it will increasingly become the target of a diverse array of low-cost, high-performance alternatives, many of which are beginning their penetration today:

    - On-line alternatives from the current vendor providing the batch services.

    - In-house integrated systems, based on minicomputers, microcomputers, or personal computers.

    - Software products that run on the existing in-house mainframe.

- The thousands of small batch vendors that make up half the market, already in difficulty due to the recession, will provide a rich source of acquisitions for large, efficient vendors, most of whom are already multiservice vendors (offering RCS, batch, professional services, and/or software products, and/or integrated systems).

INPUT

- The first markets to feel the impact will be those industry- or function-specific applications that represent a minimum of $5 million of revenue from a single hardware/software set (i.e., an application with a frozen specification running on a single type of hardware under one operating system). At this threshold it is worthwhile for a vendor to make a development/marketing/sales effort to target such an opportunity.

- With the growing concentration, the batch industry will increasingly feel the force of the U.S. antitrust laws. (In one batch market, COM, this has already occurred with Anacomp's acquisition of DSI being contested by the Justice Department.)

C.   PROCESSING FACILITIES MANAGEMENT

I.   MARKET GROWTH

- Processing facilities management is the smallest of the service market categories analyzed by INPUT but is characterized by large, multiyear contracts with good margins.

- The market is dominated by industry-specific PFM contracts to the extent that it is easy to overlook other categories. This would be a mistake, however, since contracts such as project VIABLE, the largest services contract ever awarded, are part of the utility PFM market.

- Overall PFM growth through 1987 is expected to be almost constant at 18%, as shown in Exhibit III-3, as a result of the long-term-contract nature of the business. This is well below the information services market average of 24%. It could be much greater than this, however, as a result of additional large government contracts.

EXHIBIT III-3

U.S. PROCESSING FACILITIES MANAGEMENT MARKET, 1982-1987
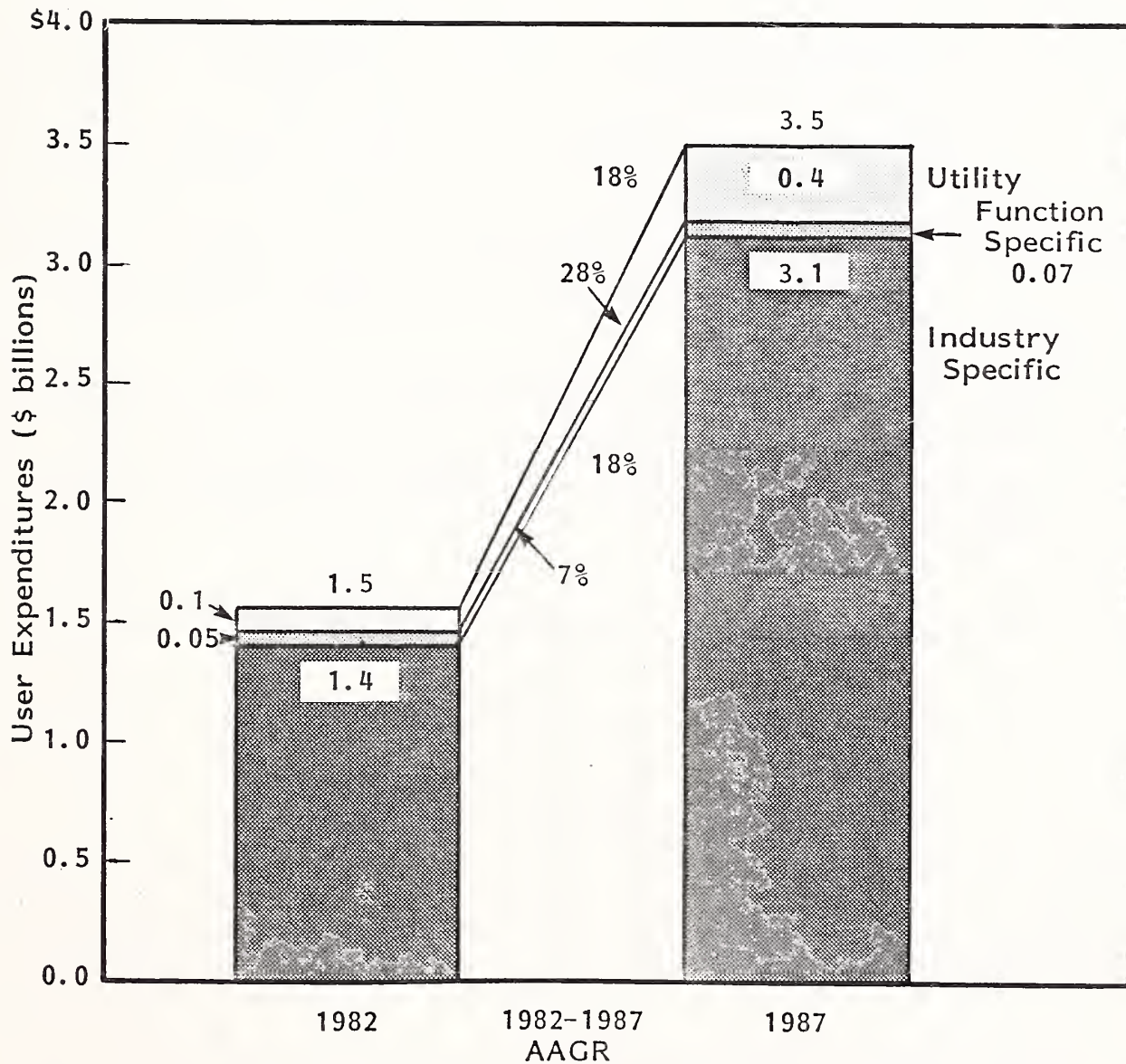
NOTE: Each market has been rounded to nearest $0.1 billion; therefore markets may not total precisely.

- The principal industry sector market is banking and finance.

  - The largest PFM vendors are active in this market - Electronic Data Systems (EDS), SEI, CSC, Sun, First Data Resources (FDR), and Systematics - which is expected to provide nearly 40% of the incremental growth from 1982 to 1987.

  - The recent deregulation moves affecting the ability of the banking industry and savings and loans to offer savings accounts free from government-imposed interest rate ceilings are regarded by the chief economist of the Bank of America as "the most significant change in financial markets in half a century." The surge in deposit and savings account handling is expected to provide good PFM opportunities.

- The second largest sector market is medical, and again the larger PFM vendors are active (Shared Medical Systems, McAuto). This sector is almost recession proof and is expected to grow much faster (22% per annum) than the market as a whole (18%).

- Only two other markets are of significance:

  - Insurance (EDS, CSC, ARC Automation, Cybertek).

  - Federal government (EDS, Informatics, CSC).

2. MARKET TRENDS

- For some time there has been a trend toward high industry concentration of the vendors supplying PFM in each of these major markets:

- Federal government.

- Banking.

- Finance.

- Medical.

- Insurance.

- Manufacturing.

- This trend is intensifying, with the market concentration occurring in narrow, vertical markets:

    - Insurance (government funded).

    - Credit card processing.

    - Credit union processing.

    - Personal trust processing.

    - Acute care hospital processing.

- In each area it is not unusual to find one vendor with 30% of the market revenue (and growing faster than the overall market, i.e., gaining market share) and as few as five major vendors, in total, servicing the market.

- Account management and control are all important since the loss of a single contract can have a very serious impact on total PFM revenues. A case in point is the loss of the ARCO account by National Data, which reduced PFM revenues from $14.6 million in 1981 to approximately $6 million in 1982 - a 60% drop.

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- The sales agreement for PFM continues to be based on the provision of professionally designed, managed, and tailored processing facilities that include the assumption of the capital investment risk. The last item is particularly relevant in federal government contracts where capital purchase approval cycles can exceed five years, but service contract approvals can be obtained in less than two.

- Performance guarantees, excellent client relations, and quality service continue to be the best assurances against business loss (and prerequisites for a good market image).

IV SOFTWARE PRODUCTS MARKETS

IV   SOFTWARE PRODUCTS MARKETS

A.   MARKET GROWTH

- During the next five years user expenditures for software products will grow at a 38% average annual growth rate, from a base of $5.5 billion in 1982 to $27.5 billion by 1987, as shown in Exhibit IV-I.

- Software products is the fastest growing of the four major delivery modes comprising the information services industry.

- By 1987 software products will replace processing services as the industry's largest service mode. Only 12 years ago the software products market was less than one-seventh the size of processing services.

- One major force in the growth of software products is the explosion of personal computer sales. Personal computer software products will grow from $0.3 billion (6% of all software products revenue) in 1981 to $3.7 billion (13%) by 1987, as shown in Exhibit IV-2.

- As shown in Exhibit IV-3, execllent growth will occur in both the systems software and the applications software markets.

- The scope of the software products market is shown in Exhibit IV-4.

EXHIBIT IV-1

MARKET FORECAST, 1982-1987,
SERVICE MODE COMPARISON

SERVICE MODES	AAGR 1982-1987 (%)	USER EXPENDITURES IN CURRENT DOLLARS ($ billions)
Software Products	38%	5.5 / 27.5
Processing Services	14	11.4 / 22.4
Professional Services	18	5.5 / 12.5
Integrated Systems	29	3.5 / 12.4

```
        0      5      10     15     20     25    $30
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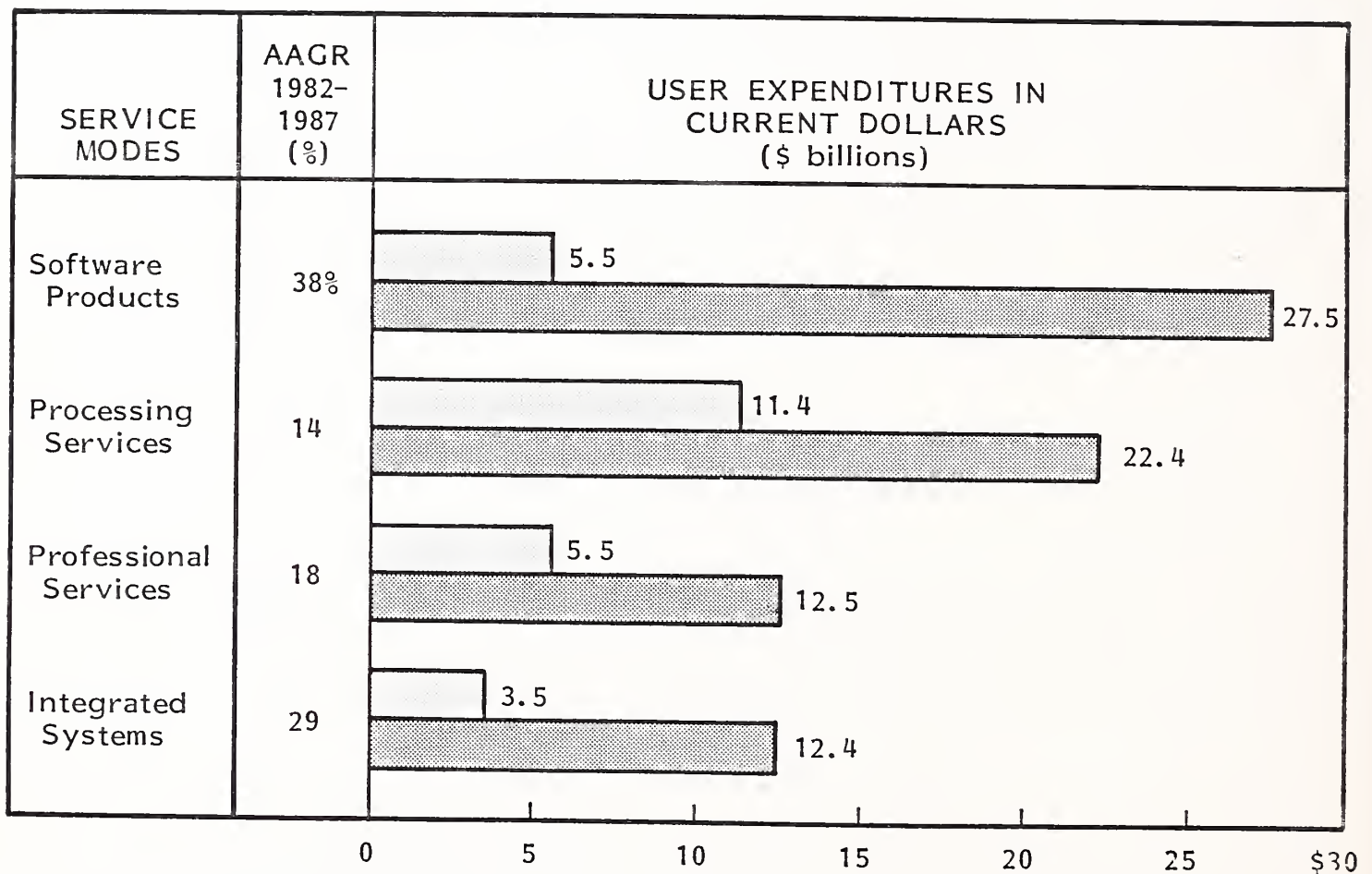
Total Expenditures

1982		$25.9 billion
1987		$74.9 billion

AAGR = 24%

EXHIBIT IV-2

PERSONAL COMPUTER SOFTWARE VERSUS
TOTAL SOFTWARE PRODUCTS USER EXPENDITURES

EXHIBIT IV-3

SYSTEMS VERSUS APPLICATIONS
SOFTWARE PRODUCTS GROWTH

Systems
$2.6

$0.3

$0.3

Applications
$2.9

1982
$5.5 Billion

Systems
$11.7

35% AAGR

38% AAGR

$1.5

47%
AAGR

$2.2

Applications
$15.9

40% AAGR

☐ Personal Computer

1987
$27.5 Billion
38% AAGR

- 32 -

EXHIBIT IV-4

SOFTWARE PRODUCTS MARKET STRUCTURE

Software Products

Systems Software

Systems Control
- Access Control
- Communications Monitors
- Encryption Systems
- Operating Systems
- Point-to-Point Control
- System Library Control
- Other

Data Center Management
- Capacity Management
- Computer Operations Scheduling
- Data Center Management
- Disk Management
- Downtime/Repair Monitoring Management
- Job Accounting
- Performance Monitors
- Tape Management
- Utilities
- Other

Applications Development

Program Development and Production Tools
- Application Generators
- Assemblers
- Automatic Documentation
- Compilers
- Debugging Aids
- Languages
- Project Control & Management Systems
- Retrieval Systems
- Spreadsheet Systems
- Translators
- Other

Data Base Management Systems
- Data Base Management Systems
- Data Dictionaries
- Other

Applications Software

Cross-Industry

Accounting
- Accounts Payable
- Accounts Receivable
- Fixed Assets
- General Ledger
- Purchasing
- Other

Human Resources
- Benefits
- Payroll
- Personnel
- Training & Education
- Other

Information Analysis
- Budgeting
- Decision Support Systems
- Financial Planning
- Forecasting
- Modeling
- Other

Sales Marketing Distribution
- Distribution Accounting
- Inventory
- Invoicing/Billing
- Mailing List
- Order Entry
- Sales Analysis
- Other

Word Processing
- Document Generators
- Text Editors
- Word Processing
- Other

Graphics
- Character Graphics
- Line Graphics
- Picture Graphics
- Other

Other
- Administrative Services
- Corporate Services
- Operations Research
- Project Control & Planning
- Scientific Engineering & Technical Support
- Other

Industry Specific
- Banking & Finance
- Discrete Manufacturing
- Education
- Federal Government
- Insurance
- Medical
- Process Manufacturing
- Retail
- Services
- State & Local Government
- Transportation
- Utilities
- Wholesale
- Other

- 33 -

B. SYSTEMS SOFTWARE PRODUCTS

I. MARKET GROWTH

- Systems software will grow from a $2.6 billion base in 1982 to an $11.7 billion business by 1987. This represents a 35% AAGR.

- The fastest growing segment of systems software is applications development tools.

2. APPLICATIONS DEVELOPMENT TOOLS

a. Market Growth

- As was shown in Exhibit IV-4, applications development tools are classified in two major categories: data base management systems (DBMS) and program development and production tools. This latter category includes not only languages and retrieval systems, but also spreadsheet products such as the immensely popular VisiCalc for personal computers. Visicalc is, in reality, an applications development tool capable of performing a variety of functions of which financial analysis is but one.

- Applications development tools will surpass both systems control and data center management software in growth and size. They account for 50% of 1982 systems software sales and will expand to 61% by 1987. Revenue will grow from a 1982 base of $1.3 billion to $7.1 billion in 1987, as shown in Exhibit IV-5.

b. Market Issues and Trends

- Tools for end-user computing are a major area of vendor opportunity for the next five years. INPUT forecasts that by 1990 75% of all processing will be at

EXHIBIT IV-5

SYSTEMS SOFTWARE PRODUCTS FORECAST,
1982-1987
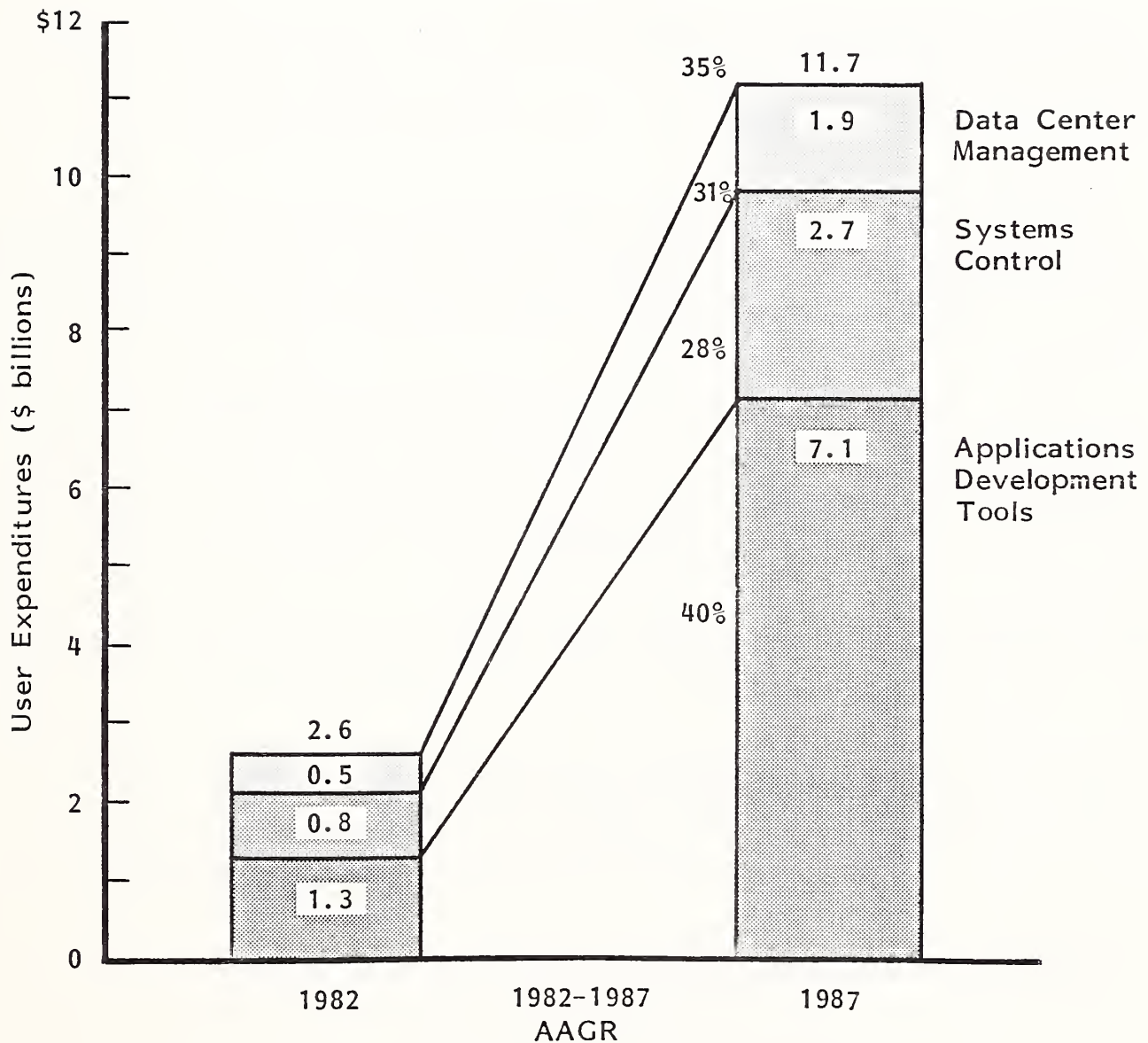
the end user's location. Noncomputer personnel will actively seek tools that generate applications requiring minimum time and specialized training.

- The phenomenal success of VisiCalc and its other spreadsheet competitors is a dramatic example of how breakthroughs in user friendly applications development tools can create large, previously untapped markets.

3. SYSTEMS CONTROL SOFTWARE

a. Market Growth

- Systems control software is the second largest of the three systems software segments. Revenue of $800 million in 1982 will grow at a five-year AAGR of 28% to become a $2.7 billion market by 1987.

- The personal computer software portion of this market will expand from a 14% share in 1982 ($115 million) to a 20% share by 1987 ($530 million).

b. Market Issues and Trends

- Driving forces behind the $1.8 billion annual increase in this market during the next five years include:

    - Expanding base of computers.

    - Increased emphasis on communicating personal computers.

    - Proliferation of portable terminals.

    - Expansion of end-user computing.

4. DATA CENTER MANAGEMENT SOFTWARE

a. Market Growth

- Data center management software encompasses software listed in Exhibit IV-4.

- Although this sector is the smallest of the three systems software categories, it is a rapidly growing market (31% for 1982-1987) with revenues of $500 million in 1982 and $1.9 billion by 1987.

- In contrast to the other two categories, very little personal computer software is sold in this segment. Data center management software is 99% mainframe and minicomputer based.

b. Market Issues and Trends

- Several forces are helping to stimulate the growth in this market during the 1982-1987 timeframe:

    - The trend in large, central sites toward increasingly more powerful and complex hardware.

    - The enhanced awareness by top management that the computer facility is essential to company operations and must be managed in a careful and productive manner.

    - Budget pressures on information systems management to use computer technology to increase its own productivity.

- The market for disk management systems and performance monitoring systems continues to be active and highly competitive.

INPUT

5. SYSTEMS SOFTWARE MARKET ISSUES AND TRENDS

- The trend toward more emphasis on end-user computing will have a major, long-term impact on systems software vendors.

    - In a nutshell, today's systems software is too cumbersome for the new hardware of the 1980s.

    - IBM's mainframe architecture of the 1980s is evolving toward end-user orientation. This focus results in significantly different needs in areas such as operating systems, telecommunications software, and data base management systems.

- INPUT believes that IBM (and other vendors to a lesser degree) will continue to expand the use of microcode in future systems. Entire operating systems will not be microcoded, but frequently used systems functions will be.

- An encouraging trend for independent systems software vendors is the increased willingness of IBM to actively seek joint marketing arrangements.

    - IBM's new processing offering, Information Network Service, actively promotes the availability of numerous highly popular systems software products from a variety of independent vendors.

    - IBM's Personal Computer offers three different non-IBM-developed operating systems (MS-DOS, CP/M, and the UCSD p-system).

    - Microsoft's MultiPlan personal computer software is now being pushed by IBM.

- Some vendors are using acquisitions to increase their competitiveness in the decade ahead. For example, Capex, a pioneer vendor of IBM OS software with 1981 revenue of $10 million, was acquired by DOS-oriented systems software product vendor Computer Associates.

- Some large processing services vendors are beginning to increase their participation in the systems software market. For example, Comshare has acquired Target Software, a developer of applications for personal computers.

C. APPLICATIONS SOFTWARE PRODUCTS

1. MARKET GROWTH

- The applications software product market is comprised of seven cross-industry segments and fourteen industry-specific sectors, as was shown in Exhibit IV-4.

- Applications software products, with a 33% increase, grew faster than all other information services industry service modes from 1981 to 1982. Revenue for 1982 will reach $2.9 billion.

- Applications software products will grow to a $15.9 billion market by 1987. This represents an impressive five-year AAGR of 40%, as shown in Exhibit IV-6.

- Personal computer applications software products will expand from 10% ($0.3 billion) of the 1982 applicatons software products market to 14% ($2.2 billion) by 1987, an AAGR of 47%, as was shown in Exhibit IV-3.

2. CROSS-INDUSTRY MARKETS

- The cross-industry applications software products market is comprised of seven segments: information analysis, accounting, human resources, word processing, graphics, sales/marketing/distribution, and "other."

EXHIBIT IV-6

APPLICATIONS SOFTWARE PRODUCTS MARKET FORECAST,
1982-1987
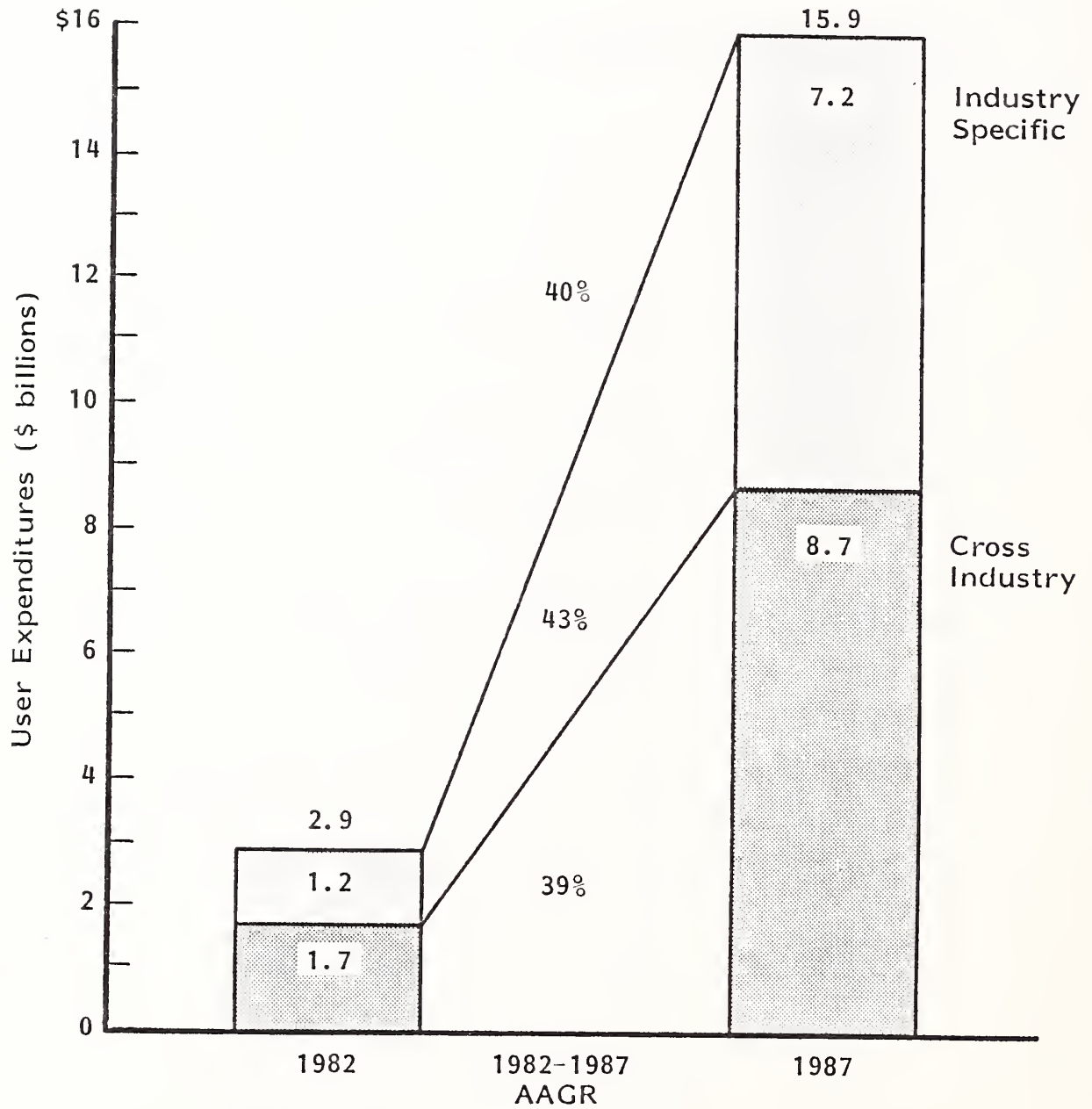
- This market will grow from $1.7 billion in 1982 to $8.7 billion by 1987, an AAGR of 39%. This sector's share of the total applications software market will decrease slightly from 59% in 1982 to 55% by 1987.

a.   Information Analysis

(i)   Market Growth

- As shown in Exhibit IV-7, by 1987 information analysis will be a $2.8 billion business. This will make it the largest as well as one of the fastest growing (52% AAGR) of the seven cross-industry sectors.

(ii)   Market Issues and Trendss

- This segment is benefiting from several mutually reinforcing trends.

    - Complexities of planning in today's economy.

    - Availability of increasingly user-attractive software for financial planning and modeling applications.

    - Strong market interest in decision support systems (DSS). (DSS are especially attractive from a marketing point of view because they address application areas used by the same people who make the decision to buy, i.e., middle and upper management. Thus, often their justification becomes easier.)

b.   Accounting Markets

(i)   Market Growth.

- As was shown in Exhibit IV-13, accounting software products is a $0.66 billion business for 1982, the largest of all the cross-industry products.

EXHIBIT IV-7

CROSS-INDUSTRY APPLICATIONS SOFTWARE PRODUCTS
MARKET FORECAST, 1982-1987

	AAGR 1982-1987 (%)	USER EXPENDITURES IN CURRENT DOLLARS ($ billions)
Information Analysis	52%	0.35 � 2.8
Accounting	33	0.66 � 2.7
Human Resources	31	0.29 ▬ 1.1
Word Processing	35	0.18 ▬ 0.8
Graphics	54	0.08 ▬ 0.7
Other	43	0.05 ▬ 0.3
Sales, Marketing, & Distribution	27	0.09 ▬ 0.3

```
        0     0.5     1.0     1.5     2.0     2.5    $3.0
```
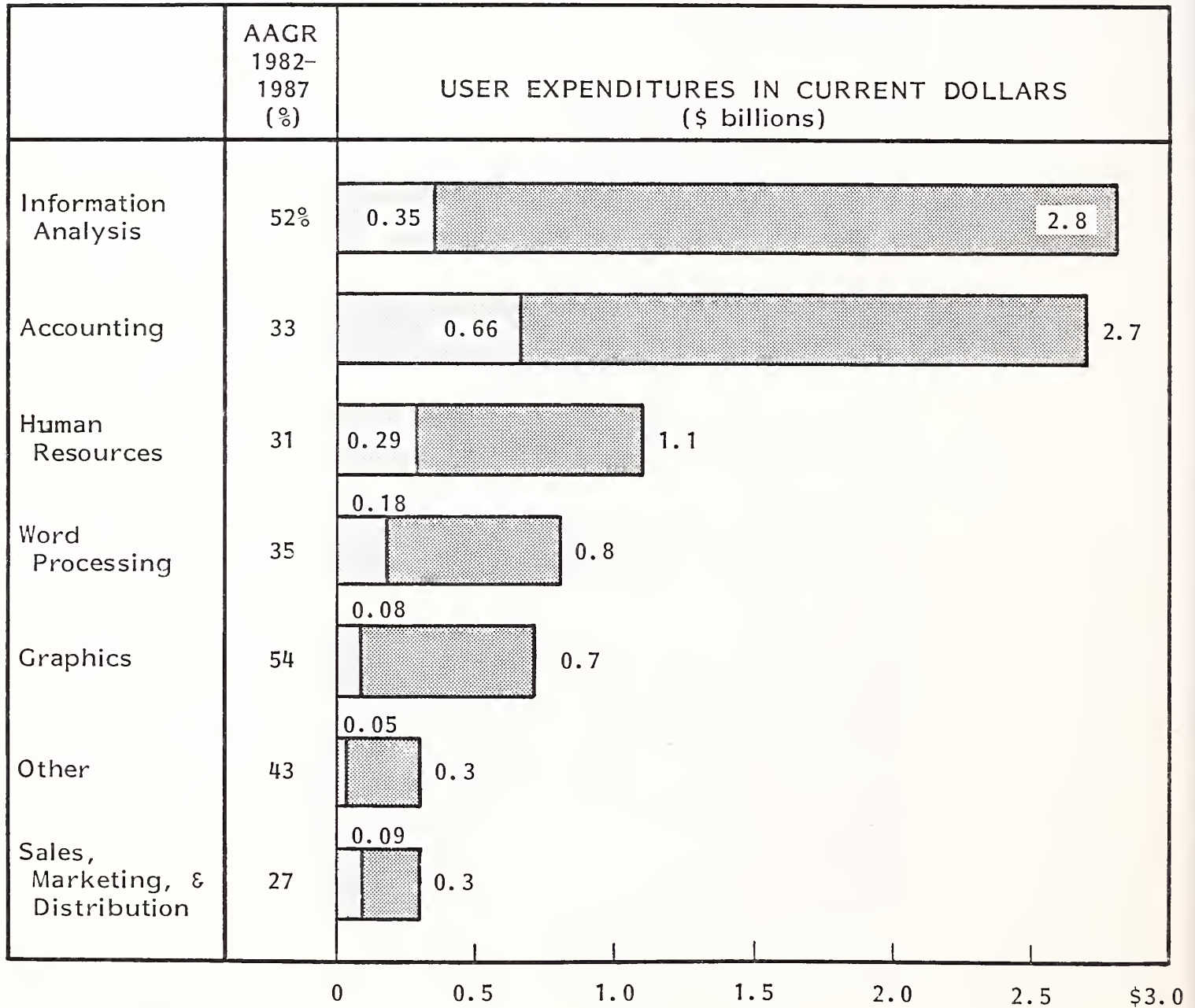
Total Expenditures

1982		1.7 billion
1987		8.7 billion

AAGR = 39%

- This segment will become a $2.7 billion sector by 1987. Its ranking will drop to second place behind information analysis.

- Accounting's AAGR of 33% is less than the 39% average for the entire cross-industry group.

● Growth of the accounting software products market will be stimulated by:

- The tougher economic climate of the 1980s. This will continue to place a strong demand on accurate, complete, and current accounting data. This is especially true for accounting systems that are cash-oriented, such as accounts receivable and payable.

- The continued trend toward deregulation. Many industries are experiencing significant changes in their strategy, size, and scope of business, which in turn can overwhelm their existing accounting systems.

- Accounting information as the primary fuel that drives analytical-processing-based applications. INPUT estimates that by 1990 analytical processing will consume 4.5 times more machine cycles than transaction processing. This demand will enhance management interest in better and more timely accounting data.

(ii) Market Issues and Trends

● Important buyer needs during the next five years include:

- Data-base-oriented systems to facilitate information retrieval.

- Carefully human-engineered input and output.

INPUT

- Disbursed processing capabilities (e.g., personal computer linkages to mini- and/or mainframe-based systems).

- Easy interfaces between accounting systems and other related functions.

c. Human Resources Markets

(i) Market Growth

- The human resources (HR) software products market will remain the third largest cross-industry sector during the 1982-1987 period. Revenue will grow from $0.29 to $1.1 billion by 1987 for a 31% AAGR, as was shown in Exhibit IV-7.

- Human resources growth has slowed since the "fast-track" days of 1980-1981 when revenue increased 41%. The reasons include:

    - The Reagan administration's lessening of regulatory policies that had fueled HR growth (especially that of personnel systems) in previous years.

    - The impact of the economy, which has resulted in some postponement of additional automation for "nonmainstream" departments, such as personnel.

- On the positive side, a number of factors will contribute in the future to keeping HR as a major cross-industry market:

    - Increased management focus on control of labor costs, especially in the services industries, which are comprising an ever larger share of the gross national product.

- The extension of HR systems into new areas, such as benefits adminis-
tration applications, which assist companies in improving control over
an increasingly important portion of personnel costs.

(ii) Market Issues and Trends.

- This market sector combines one of the most widely accepted and easiest to
understand software products (payroll) with some of the most complex and
intangible products (personnel, training, and education). A number of vendors
have stumbled in this market by underestimating the differences in marketing
these two types of products.

d. <u>Word Processing Markets</u>

(i) Market Growth

- This market analysis excludes software that is "bundled" into manufacturers'
products, such as those from Wang, IBM, and Xerox. It addresses products
provided independently from hardware.

- The word processing software products market will increase more than four-
fold in the next five years to reach $0.8 billion by 1987, a 35% AAGR, as was
shown in Exhibit IV-7.

- This five-year growth rate represents a decline from rates experienced in the
past two years. Word processing software products sales grew from $85
million in 1980 to $133 million in 1981 (a 56% increase). Revenue in 1982 will
be $180 million, a 35% increase over 1981.

- Personal computer software will comprise 47% of this market in 1982 ($85
million) and 48% in 1987 ($380 million).

(ii)   Market Issues and Trends

● The recent introduction of personal computer software with integrated functions threatens to make obsolete some word processing systems. As mentioned earlier, the integrated function concept combines word processing with graphics, modeling, data base, and communications. Early users report significant improvements in productivity over use of nonintegrated systems.

● Marketplace interest in word processing on personal computers has also helped to stimulate interest in word processing on mainframes. As a result, vendors such as Applied Data Research are more actively promoting such systems.

e.   Graphics Markets

(i)   Market Growth

● Graphics software products are the fastest growing cross-industry segment with a 1982-1987 AAGR of 54%, as was shown in Exhibit IV-7.

-    User expenditures will grow from $80 million in 1982 to $700 million in 1987. This represents an annual increase of $120 million, which will make graphics the fifth largest cross-industry sector by 1987.

-    Personal computer software products comprise 19% of the market in 1982 and will hold 17% of that market in 1987.

(ii)   Market Issues and Trends

● The market for graphics software has grown almost threefold in the past two years (1980 revenue was $30 million). A number of factors are stimulating this market.

- Graphics-related hardware continues to decrease in cost and increase in function.

- Personal computers with impressive graphics capabilities are reaching the executive suite, thus whetting management's appetite for visual information.

- Decision support systems, with graphics features, are gaining in popularity.

f. Sales, Marketing, and Distribution Markets

(i) Market Growth

- This market will grow from a base of $90 million in 1982 to $300 million in 1987 for an AAGR of 27%, as was shown in Exhibit IV-7. Personal computer software products comprise 6% ($5 million) of the 1982 market and will grow to 7% ($20 million) of the 1987 market.

(ii) Market Issues and Trends

- Although currently small in terms of other cross-industry markets, INPUT believes significant opportunities exist because most vendors have ignored this segment as an area of specialization.

- U.S. businesses continue to move in the direction of marketing rather than a production-oriented top management strategy.

  - In the process, marketing-related functions will evolve away from "gut feel" decision making toward more analytically based methods.

  - Computers will become a major support tool for progressive management.

INPUT

g.   Other Cross-Industry Markets

(i)   Market Growth

- Other cross-industry software products markets not included above will grow at a 43% AAGR from a 1982 base of $50 million to a 1987 total of $300 million.

- This segment is the third fastest growing of the cross-industry applications, but is a combination of many different product areas, such as scientific and engineering, project control and planning, and operations research.

- Personal computer software products account for about 10% of the total market during this five-year forecast period.

(ii)   Market Issues and Trends

- The application areas making up the largest part of this market segment, such as scientific and engineering, typically require large amounts of computing power. As a result, this market historically has been processing services and integrated systems vendors, rather than software products suppliers.

3.   MARKET ISSUES AND TRENDS FOR APPLICATIONS SOFTWARE PRODUCTS

- The personal computer is having a major impact on the applications software market. It is:

    -    Enlarging the market. Market share for personal computer software ranges from 5% to 45%, depending upon the segment.

    -    Stimulating end-user interest in computer solutions of all types.

- Setting new standards for user friendliness in software products that will impact vendors of mini- and mainframe-based software.

- Placing demands on vendors to provide interfaces to popular personal computers.

- Creating new mini- and mainframe-based software product market opportunities (e.g., Parallax's IBM 3270-based financial planning software that incorporates many of the popular features of the personal computer spreadsheet systems).

- The concept of the Information Center will continue to build in popularity during the next five years. This is to the advantage of the applications software vendor as it provides a convenient, centralized contact point within an organization for vendors to reach both the end users and the information systems department.

- Applications software products buyers will give higher priorities in the next five years to systems that have high potential for integration with other related systems.

- The market for home personal computer applications is now beginning to accelerate. Much new software will be introduced during 1983 for this emerging market.

V PROFESSIONAL SERVICES MARKETS

V   PROFESSIONAL SERVICES MARKETS

A.   MARKET GROWTH

- The professional services market will experience an 18% AAGR from 1982 to 1987. User expenditures will grow from a 1982 base of $5.5 billion to $12.5 billion by 1987, as shown in Exhibit V-1.

- During this five-year period, price increases due to inflation are expected to average 5% annually.

- Professional services is a major market that will remain almost identical in size to the remote processing services market throughout the 1982-1987 period.

- The market for professional services relating to personal computers will be $25 million for 1982 and will increase to $250 million by 1987.

- Programming and analysis (perhaps more properly termed "software development") is the largest segment of the professional services market. It will grow from $4.2 billion in 1982 to $9.3 billion in 1987 for an AAGR of 18%. Its share of the professional services market will be steady around 74% during this five-year period.

EXHIBIT V-1

PROFESSIONAL SERVICES MARKET FORECAST,
1982-1987
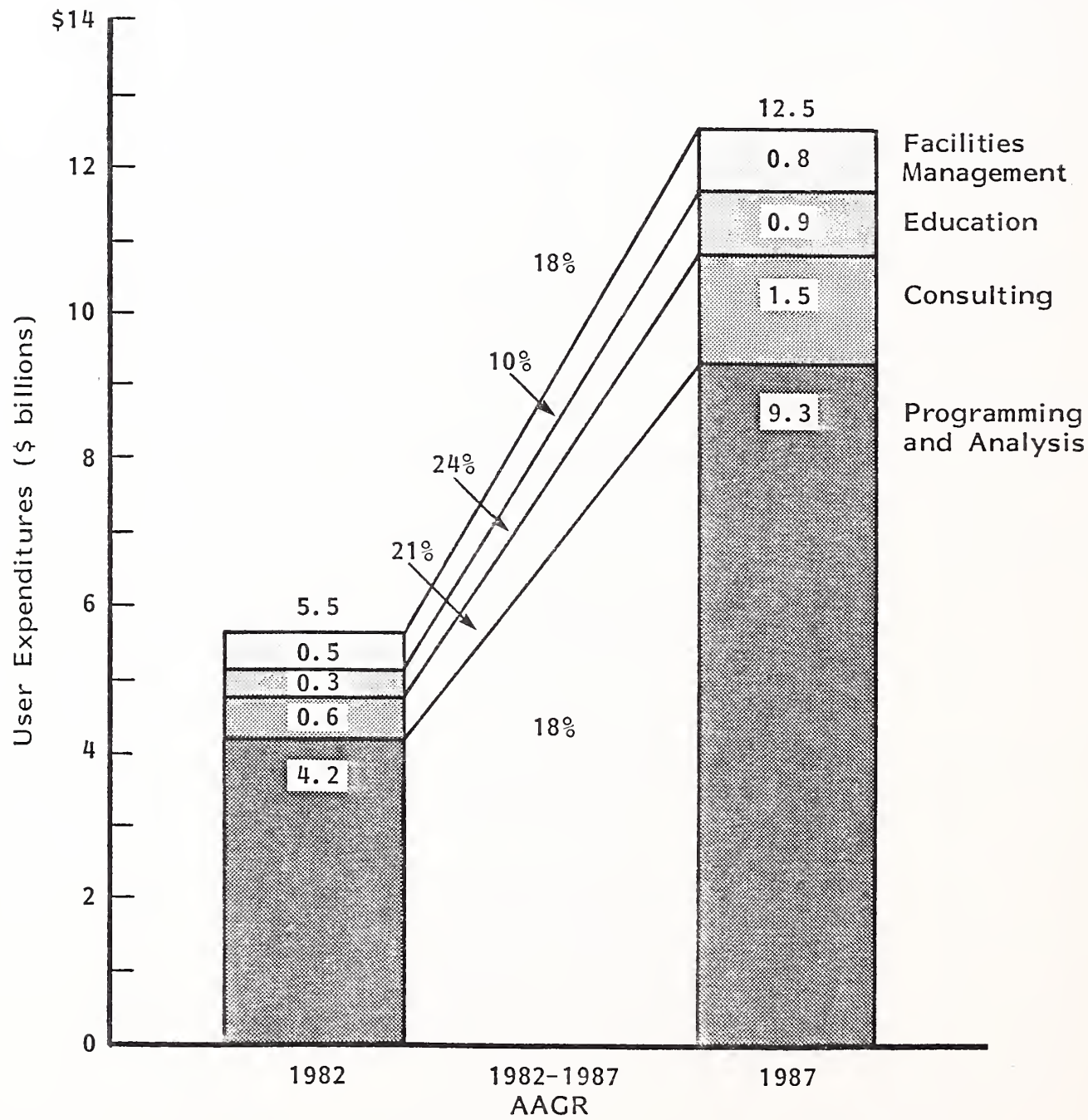
- Consulting will remain the second largest segment. Its market share was 11% in 1982 ($0.6 billion revenue) and will be 12% ($1.5 billion revenue) in 1987. Its five-year AAGR is 21%.

- Although education was the smallest of the segments in 1982 with revenue of $0.3 billion and a 5% market share, by 1987 it will have experienced the largest AAGR (24%) and thus will rank in third place with $0.9 billion in revenue and a 7% market share.

- Professional services facilities management will drop from third place in size in 1982 (9% market share on $0.5 billion revenue) to fourth place in 1987 (6% share on $0.8 billion revenue). Its AAGR of 10% is the lowest of the four professional services segments.

- The annual growth rate of the total professional services market declined by over one-half in 1982. The annual growth rate will not return to the 20% range until 1985.

B.   MARKET ISSUES AND TRENDS

- Six of the top 10 vendors derive most of their professional services revenue from the government rather than the commercial sector.

- INPUT's surveys of computer sites during 1982 identified many problem areas of information systems managers that professional services vendors are well positioned to help resolve.

- Top managers of information systems departments cited "personnel" (i.e., hiring, training, and retaining) as the number one problem they faced.

INPUT

- Difficulties in hiring were especially pronounced in the process manufacturing, insurance, and distribution industries.

- Higher than average staff turnover was reported in the banking and finance, utility, and distribution industry sectors.

- Problems with staffing are expected to continue for the next several years providing a continual stimulant for contracting with professional services vendors.

- One INPUT survey revealed another aspect of the built-in demand for software solutions. On the average almost two-thirds of the software currently being used by information systems departments surveyed was five years old or older. Major external forces, such as the economy and deregulation, are helping to accelerate the obsolescence of that aging software.

- Applications that will stimulate professional services activity during the next several years will be characterized by teleprocessing, data bases and distributed data processing.

- Applications software systems in general are growing in size and complexity due to the combined forces of exploding technology and demand from end users.

  - Personal computers are evolving into nodes that connect, as required, with other nodes, mini, and mainframe computers.

  - Few information systems departments can retain the necessary variety of technical skills in-house to keep up with end users' demands.

  - Software product vendors will not be able to define packages to fit the requirements of every major application.
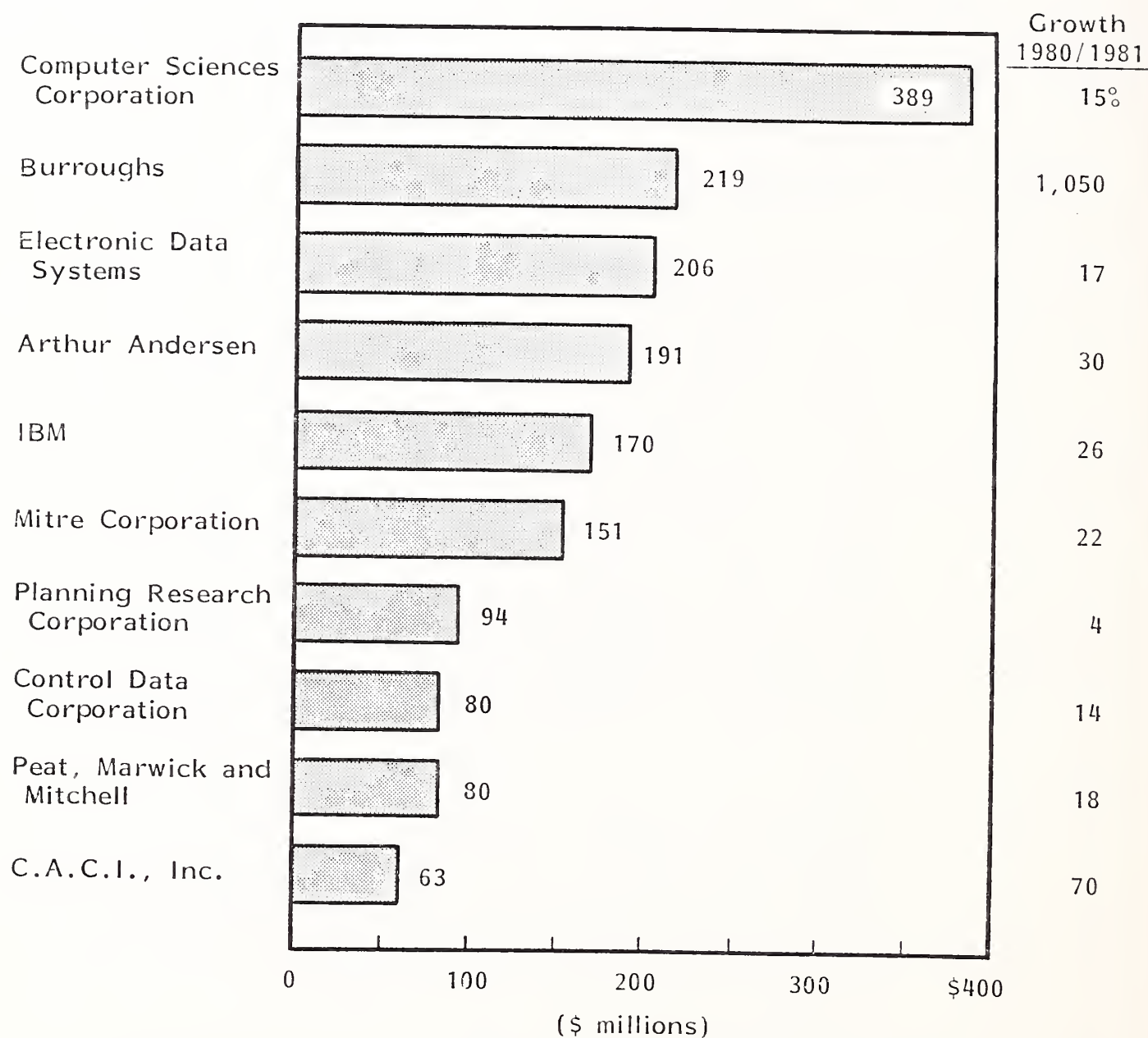
- In spite of the outpouring of personal computer software packages, 25% of end users surveyed plan to get customized software, either from internal or external sources.

● The key characteristic of the systems of the 1980s is integration. Integrated systems require more skill to design, develop, and install. This major market need provides significant opportunities for professional services vendors.

C.   COMPETITIVE ANALYSIS

● Three types of vendors are active in the professional services market:

- Type I. These firms devote 100% of their business resources to this market. Examples include C.A.C.I. and Cutler-Williams.

- Type II. These firms have one or more business units dedicated to professional services, but they also are active in other information services areas (such as processing services, software products, or integrated systems) and/or may be active in businesses outside the information services industry. Examples include Computer Sciences Corporation, Control Data Corporation, and United Telecom Computer Group.

- Type III. These vendors tie professional services to the sale of other products or services. They look upon professional services as an "add-on" revenue source. Firms in this category include Cullinane Data Base Systems and University Computing Company.

● Vendors with the largest revenue in professional services tend to be Type II firms, as shown in Exhibit V-2.

EXHIBIT V-2

TEN LARGEST PROFESSIONAL SERVICES VENDORS
(U.S. NONCAPTIVE REVENUE)
CALENDAR YEAR 1981

		Growth 1980/1981
Computer Sciences Corporation	389	15%
Burroughs	219	1,050
Electronic Data Systems	206	17
Arthur Andersen	191	30
IBM	170	26
Mitre Corporation	151	22
Planning Research Corporation	94	4
Control Data Corporation	80	14
Peat, Marwick and Mitchell	80	18
C.A.C.I., Inc.	63	70

($ millions)

0   100   200   300 $400

INPU

- The "Big 8" accounting firms are especially active in professional services.

  - Two of the ten largest professional services vendors are Big 8 firms.

  - Seven of the Big 8 are in the top 40.

- INPUT anticipates that a number of dedicated professional services vendors will be acquired by larger firms over the next five years as a means of gaining both software development resources and access to the customers of the acquired firm. An example of this trend is the acquisition by CAP Gemini of Spiridellis, one of the top 10 fastest growing professional services firms.

INPUT

VI INTEGRATED SYSTEMS MARKETS

VI   INTEGRATED SYSTEMS MARKETS

A.   MARKET GROWTH

- The growth of integrated systems sales in 1982 was off 13% compared with 1981 (total revenues grew only 22% compared with 34% in 1981). Few vendors escaped the trend. Particularly hard hit as a group were the CAD/CAM vendors, whose pretax income suffered considerably even though revenues continued to climb.

- Individual companies that payed attention to their competitive posture were nevertheless able to accomplish outstanding performances in their particular field:

    - ASK Computer in manufacturing control systems.

    - Intergraph in the CAD/CAM group.

    - Reynolds and Reynolds (who managed to increase revenues in the first nine months of 1982, selling systems to automobile dealers).

- The integrated systems industry was characterized by sharply reduced prices in 1982 as vendors attempted to offset weak demand and increased competition. Overall the deterioration in balance sheets was severe.

INPUT

- The total value of shipments in 1982 was $3.5 billion, and growth is expected to be 22% in 1983. This is a relatively poor expectation for an industry used to growth averaging 35%. Thereafter, 1984 is expected to be a year of recovery and 1985 the year that clears the pipeline of delayed orders.

- Finally, in 1986, the industry will resume steady growth at just over 30%, down from pre-1981 years. Exhibit VI-1 shows the compound growth of function-specific systems and industry-specific systems.

- By far the best market is the discrete manufacturing sector where 80% of the businesses have fewer than 50 employees. Reduced-cost integrated systems that offer sophisticated manufacturing control coupled with basic accounting are finding a ready market, even though the largest manufacturing concerns (which account for less than 2% of the establishments) are experiencing real difficulty in surviving. Start-up manufacturing concerns continue to be the bulk of new ventures.

- Integrated systems have already made substantial inroads into the banking and finance sector, but the recent deregulation moves will expand this market further. Growth from 1982 to 1987 is expected to be at an AAGR of 30%.

- The fastest growth area is expected to be the services sector, which serves tax consultants, lawyers, and CPA firms. Growth here is expected to be 33% AAGR from 1982 to 1987, albeit from a much smaller base.

- The least interesting market is education, which accounted for the smallest volume of revenue in 1982 and will grow the most slowly over the forecast period.

EXHIBIT VI-1

U.S. INTEGRATED SYSTEMS MARKET,

1982-1987
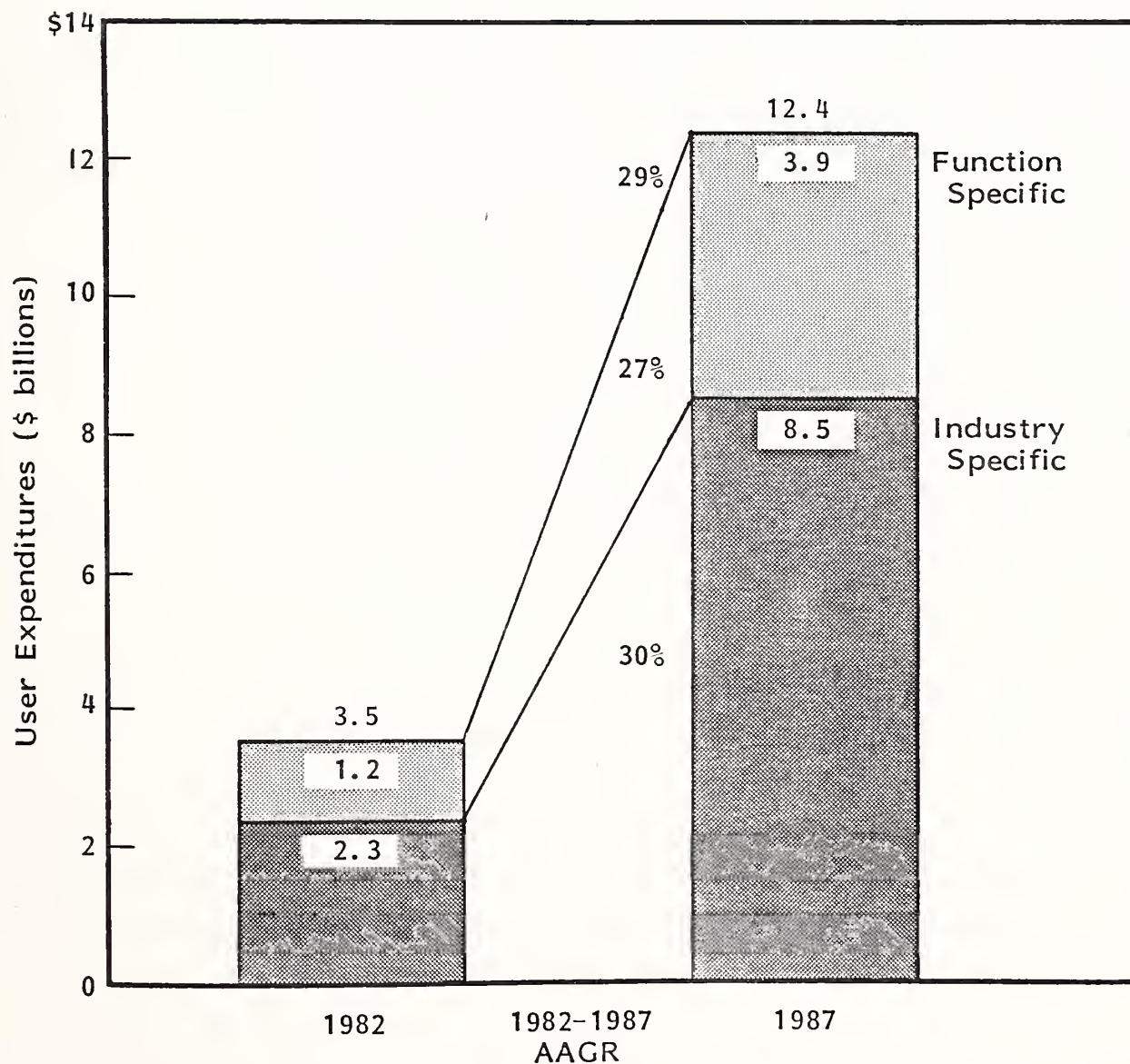
NOTE: Each market has been rounded to nearest $0.1 billion; therefore markets may not total precisely.

INPUT
MAP2YMDB

B. COMPETITIVE ANALYSIS

- With a market share almost twice the size of the nearest vendor, Computervision is the leading vendor of integrated systems in the CAD/CAM market. By 1987 Computervision will be a three-quarter billion dollar CAD/CAM vendor.

- The most successful CAD/CAM vendor in 1982's difficult economy was Intergraph, which added nearly $40 million to its revenues in an extremely competitive market and in the face of substantial user cutbacks in CAD/CAM expenditures. Intergraph overtook Calma (GE) for fourth place in 1982.

- The second largest vendor, Triad, services the distribution sector (retail and wholesale stores) - or "main street America" establishments. Growth has stalled, however, because of the economy.

- Computer Consoles is the uncontested number one supplier of automated directory assistance systems. Revenues continued to grow in 1982 at over 30%.

- C3 integrates systems for the government, particularly for defense department contracts.

- Reynolds and Reynolds boldly entered assembly of its own computer systems, despite multiple historic failures by other companies who tried the same thing. R&R managed to hold revenues above the 1981 level despite the continuing decline of their principal market, automobile dealers.

- Auto-trol had a difficult year, introducing a new 32-bit system in the face of strong competition. The company continues to show a loss on operations.

C. MARKET ISSUES AND TRENDS

- The key to a successful integrated systems venture is software and vertical market specialization. The number of such opportunities far exceeds the products available at this time.

- Hardware specialization is also necessary in the early stages. This facilitates marketing and sales efforts and establishes good in-house understanding of company products. Once the initial market penetration is accomplished, three directions may be taken:

    - Develop remote computing services that capture prospects too small (or tentative) to obtain their own system. (ASK Computer has begun establishing such a service.)

    - Expand product offerings by adding low-entry systems (e.g., personal-computer-based systems) and top-of-the-line products (not necessarily but preferably of the same hardware line as that used for the main-stream business).

    - Add integrated software extensions that (a) expand add-on revenues from the installed customer base and (b) improve the competitive posture of the company's main software product. Such extensions should feed off an integrated data base.

- Exhibit VI-2 shows 1982's uneven impact on the main integrated systems vendors. In light of the overall contraction of pretax income, ASK Computer's performance is all the more noteworthy.

- The industry has yet to see a merger of two integrated systems vendors, but this phase will begin as economic recovery is fully established in 1985. At that time there will be numerous opportunities for successful integrated systems vendors to acquire smaller vendors with an undercapitalized, viable product.

EXHIBIT VI-2

COMPARISON OF FIRST NINE MONTHS RESULTS, 1981/1982, INTEGRATED SYSTEMS VENDORS

COMPANY	REVENUE Q1-Q3 ($ millions)		PERCENT CHANGE	PRETAX INCOME Q1-Q3 ($ thousands)		PERCENT CHANGE
	1981	1982		1981	1982	
ASK Computer	$ 13.0	$ 19.3	48%	$ 2,443	$ 3,729	53%
Auto-trol	34.2	32.8	(4)	(5,778)	(4,187)	28
Computervision	194.4	243.5	25	43,990	39,635	(10)
Computer Consoles	33.4	43.9	31	3,074	669	(78)
DIMIS	2.5	3.7	51	72	(1,334)	(1,953)
Intergraph	62.0	100.7	63	10,323	13,322	29
Reynolds and Reynolds	88.4	89.8	2	4,266	3,605	(15)
Triad Systems	63.1	66.3	5	8,300	2,900	(65)
Weighted Averages	–	–	26%	–	–	(37%)

VII   FIELD SERVICE

A.   MARKET GROWTH - FIELD SERVICE REVENUE

- Two factors are conspiring to hold back the rate of growth of field service revenue in both the short and long term:

    - Flat equipment sales due to a worsening U.S. economy, which was initially anticipated to have only short-term impact but is now expected to affect the medium term also.

    - Improved reliability in new products, which will allow a reduction in field service charges from the older product lines (which will be emphasized as a competitive factor by marketing); this affects a broader and broader range of products (and a larger and larger slice of field service revenue).

- As a result, the 1982 to 1987 growth forecast in Exhibit VII-1 is at a slightly slower rate than that predicted in 1981 (19.8%, down from 20%).

- Field service revenue per field engineer improved in 1981 due to increased efficiency of new maintenance techniques and is expected to grow at 13.4% per annum. In 1981 the revenue per engineer was higher than the billing rates of management consultants in the information services industry.

EXHIBIT VII-1

FORECAST FIELD SERVICE REVENUE
AND PERSONNEL GROWTH, 1982-1987

YEAR	FIELD SERVICE REVENUE ($ millions)	FIELD MAINTENANCE PERSONNEL (thousands)	REVENUE PER FIELD MAINTENANCE PERSON ($ thousands)
1981	$7,750	136	$56.9
1982	9,130	147	62.1
1983	10,990	157	70.0
1984	13,460	166	81.1
1985	15,960	175	91.2
1986	19,320	184	105.0
1987	22,890	193	118.6
AAGR (percent)	19.8%	6.0%	13.0%

- The number of field service personnel in the industry is anticipated to grow at only 6%, the result of better overall productivity and equipment reliability.

- As the installed base migrates to newer products with lower maintenance costs, revenue growth will slow. This implies that field service management needs to reorient its maintenance strategy to target new service growth areas now.

B.   MARKET GROWTH - SOFTWARE MAINTENANCE

- System software maintenance, now commonly (though not solely) the responsibility of the field service organization, has yet to be fully exploited as a revenue base:

    - Only partial site development has been achieved for all the system software options available on the hardware.

    - Many system software items have service charges inappropriate to the ongoing development and error correction needed at the item's particular stage of development.

    - Once the configuration sale has been made, salesmen do not target system software sales, unless the user requests them or a particular hardware upgrade demands them.

- IBM alone has been successful in marketing system software. Indeed, the complexity of options has resulted in overkill of user requirements in some cases (e.g., the 4300 series, where system software library options need careful user screening if they are to be deleted from the chargeable items list).

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- As vendors become more adept at focusing on this opportunity, system software sales (and the maintenance revenue that goes with them) will rapidly increase over the 1983-1984 period.

- Simultaneously, maintenance charges for these items will be brought in line with development and maintenance activities, raising the overall revenue base by as much as 25% to 35% above equivalent 1982 charges.

- The combination of these two forces plus the growth of the equipment-installed base will double system software maintenance revenue over the next two years.

- Field service management must carefully stage the user base from one major system software release to another in synchronism with the major hardware charge levels (field charge orders). This will be easier for on-site service personnel to do than remote software support personnel, as in the past.

C. THE USER ENVIRONMENT

- Field service managers must understand the user's environment and needs beyond the traditional preoccupation with service levels and equipment performance if they intend to plan their activities and strategies rather than react to everyday events in a fire-fighting mode.

- Looking at planned user IS expenditures in each of the equipment categories serviced shows what service requirements will be in terms of contract types, engineer skill mix, and spares holding.

1.   USER EXPENDITURES GROWTH, 1981-1982

•   A summary of user expenditures is provided in Exhibit VII-2. Two things must
     be borne in mind when analyzing an exhibit such as this:

     -    The respondent's average budget indicates typical spending on each
          equipment category, but it is most useful when combined with the net
          change, 1981-1982, to produce incremental (new) dollar spending.

     -    The net change percentage only indicates growth rate, not necessarily
          those areas contributing the most dollars.

     -    For example, the highest net growth area in 1982 was the micro-
          computer/personal computer area, but it represented only 6% of new
          dollar spending since the growth started from a small average budget.
          It is also the smallest increment in the 1983 budgetary increase.

2.   USER CONCERN WITH RELIABILITY

•   Of all the field-service-related issues users consider when choosing equip-
     ment, system reliability (i.e., software and hardware reliability) is the most
     important.

•   This concern easily outweighs vendor reputation and the cost of field
     service. Users are clearly prepared to pay extra for quality products they can
     rely on to perform consistently.

3.   PREFERENCE FOR ON-SITE MAINTENANCE

•   As more and more low-cost products enter the market, vendors are looking to
     reduce field service support by varying combinations of remote fault analysis,
     customer self-help, carry-in service, and the like.

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EXHIBIT VII-2

INFORMATION SYSTEMS EXPENDITURES GROWTH
BY CATEGORY, 1981-1982
(All Sectors)

EQUIPMENT CATEGORY	RESPONDENTS' AVERAGE BUDGET ROUNDED ($ thousands)	PERCENT OF COMPANIES WITH:		NET CHANGE 1981/1982 (percent)
		INCREASE	DECREASE	
Mainframes	767	80	20	+11
Minicomputers	258	97	3	+27
Micro/Personal	39	95	5	+59
Terminals	598	87	13	+14
Peripherals	366	94	6	+28
Communications HW/SW	157	94	6	+16

Source: 128 User Responses

- However, a recent INPUT study of low-cost equipment maintenance showed that users would prefer to have on-site service, even though this calls for annual expenditures up to 25% of the list price of the product.

- Vendors should therefore analyze profitable ways to provide the maintenance service users want rather than assume service charges will frighten them away.

4. INFLUENCE OF FIELD SERVICE ENGINEERS ON USER SPENDING

- Users often think the field service engineer's technical knowledge makes him an IS specialist and therefore follow his opinion on what to buy and when.

- This gives vendors the opportunity to gain valuable insight into users' spending plans and to influence purchase decisions that might otherwise go against the vendor or be postponed.

- Used responsibly and with the user's long-term good in mind, the field service workforce can contribute constructively to vendor sales planning.

D. THE VENDOR ENVIRONMENT

1. FUTURE INTEGRATION OF OFFICE PRODUCTS WITH INFORMATION SYSTEMS

- Changes in product mix have been a constant preoccupation of field service managers:

  - Application of new technologies affecting parts of the installed base.

  - Introduction of new technology versions of existing products.

- Introduction of new products, whether for existing markets or new ones.

• These constant changes place demands on all aspects of field service from spare parts management to field engineer training. They normally occur, however, within the markets and product lines that field service management knows intimately.

• Within the next five years, many field service organizations will face a challenge of another order: the integration of office products with information systems.

• This is not a merger of two industries of equal maturity. The office products market, only in its infancy, has not progressed beyond an initial attempt at office automation.

• Office automation is defined as the application of a set of products and services to improve existing paper-based office procedures. The office of the future will contain products and services requiring fundamental changes in existing office procedures.

• Experience to date suggests that office automation is the first, necessary step in the office of the future. Automation shows that a communications network must be set up to allow the separate parts of the automated office to communicate with each other.

• At that point the IS manager steps in:

- Networks are his province.

- Office automation expenditures will have reached a size equivalent to 25% to 30% of IS expenditures.

-       The company needs an integrated information-handling plan and management.

• This stage is already visible in large user sites, resulting in the creation of the post of "Vice President of Information Processing," or the equivalent, whose responsibilities are defined along market sector lines as opposed to product lines.

• At the field service level, this creates the same difficulties that users are facing:

-       The field service manager responsible for information systems has no experience with office product needs.

-       The user IS manager has no experience with office products users' needs.

• The need, therefore, is less for technical ability than for management understanding (and setting the right direction).

2.   CHANGE IN PRODUCT MIX

• The office products integration problem is still some way off for most field service managers interviewed.   One problem already here, however, is the rapidly changing product mix in information systems.

• Vendors of compatible lines of mainframe products have had to contend with the rapid increase in power and software capability of the minicomputer. The mini also introduced distributed processing, a necessary corollary of which was networking. Both caused fundamental changes in field service requirements.

- Technology improvements have continued, and the microcomputer is now bringing a second wave of change to information systems, extending the concept of distributed processing to individual users (as opposed to groups of users).

- Two revolutionary products have resulted from this:

  - The personal computer.

  - The executive workstation.

- Both supply local processing power and storage to the individual user; both rely on software to determine their role; and neither needs remote processing power to become functional (as terminals do, for example).

- Because of all these changes, maintenance strategies must be revised to accommodate:

  - Low-cost products.

  - Wide geographic product dispersion.

  - Need to preserve the standard of service.

  - Distributor networks.

  - Need for maintained or improved profit levels.

3. PERSONNEL POLICIES

- The product mix changes, the move toward part exchange/board swapout, and the establishment of software support centers and remote diagnostic centers are changing the nature and level of expertise field service organizations require:

- A small number of highly specialized, highly experienced professionals to man support centers.

- Many nonspecialized, low-level skilled engineers for site visits.

- A small number of highly skilled engineers for on-site customer residency, where required.

- A small number of highly experienced spares center, diagnostic center, and software support center managers.

- A small cadre of financial administrators and planners.

- Many of the administrative and managerial skills needed for these new structures will not be found in the current field service force. Promoting good engineers into managerial positions is usually a double disaster, turning a good engineer into a mediocre manager.

- Clear personnel policies that enable the current service force to understand changes are vital to successful creation of a new structure.

4.   CHANGE IN MAINTENANCE STRATEGIES

- Vendors have met the challenge of the rapidly changing product mix in information systems in a variety of ways, including:

  - Attempts at educating the user to use central repair shops and "return for repair" contracts.

  - Adding additional tiers of response levels/types of contracts.

  - Test marketing third-party module repair/delivery service.

- Partial user self-maintenance.

- Redundant hardware left on-site (e.g., extra terminal).

- User-purchased spares.

- Software support centers.

- Remote diagnostic centers.

- Facilities management service (of all equipment on-site from multiple vendors).

- Many vendors' cost control procedures still do not allow accurate monitoring of the impact of low-cost products on overall costs, and they are therefore not sure how big the problem is.

- Most vendors realize the need for accuracy, however. They have established or delegated profit center responsibility within the field service organization, and extended cost and revenue tracking all the way down to individual customer sites.

- Organizing for these changes in maintenance strategies is not easy because it strikes at the heart of the traditional field service engineer skills profile.

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